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ABSTRACT

The program of systematic evaluation of variables associated with visual learning was initiated in 1965 to investigate the impact of variables linked to effective, efficient use of instructional visual materials. A prototype experimental package, containing a specific unit of cognitive content, learner achievement objectives, four individual criterion tests, and a 2000-word instructional script, was developed to ensure generalizability and continuity among the different studies. Conclusions based on results of over 100 published studies using the materials have indicated that present methods of selecting and using visual materials are ineffective and wasteful, and that visualization of instruction is often no more effective than the same instruction without visualization. Specifically, the use of visual materials to complement oral/print instruction is not equally effective in all instructional environments, and their effectiveness is primarily dependent on such variables as the amount of realistic detail provided, method of use (externally or self-paced), learner characteristics, type or level of educational objectives, attention-focusing devices, and achievement test format. Because of a need for guidelines leading to effective use of visualization in education, research with the program will continue. (LMM)

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A Futuristic Projection for the Program of Systematic Evaluation

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The program of Systematic Evaluation of variables associated with visual learning was initiated in 1965. The general objective of the Program was to investigate the impact of different variables associated with the effective and efficient use of visual materials in the teaching-learning process. To achieve a level of programmatic research it was necessary that continuity and generalizability exist between and among the different experimental studies. Consequently, considerable effort was expended in designing and developing an experimental package of research materials which would serve as the prototype throughout a program of systematic evaluation. A specific unit of cognitive content was identified, learner achievement objectives stated, four individual criterion tests (measuring different educational objectives) developed and a 2,000 word instructional script was prepared.

Over the years the instructional impact of numerous variables associated with the design and use of visual materials in the teaching-learning environment have been investigated in a variety of presentation formats: television, synchronized slide-audiotaped instruction, visualized programmed instruction, regular textbook type of instruction (visualized), etc. To date approximately 40,000* college students and 8,000 high school students have been involved in the Program of Systematic Evaluation which has come to represent the most comprehensive and systematic attempt to identify those variables associated with visualized instruction which are most effective in facilitating student achievement of specified learning objectives.

Over one hundred experimental studies (1965-1982) reporting the results of this research program have been published by the author and his colleagues in a dozen different journals in the United States, Germany and Great Britain. Conclusions obtained from these studies have indicated that the present methods of selecting and using visual materials are grossly ineffective and wasteful and that, in many cases, for specific educational objectives visualization of content material is no more effective than the same instruction without visualization. Specifically, the results indicate that the use of visual materials to complement oral/print instruction is not equally effective in all instructional environments. Effectiveness and efficienty in visualized instruction being primarily dependent upon (a) the amount of realistic detail contained in

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*These figures do not include those subjects involved in action type research activities (utilizing the instructional and evaluation materials developed in the Program) leading to more sophisticated instruction and training programs which have been conducted and/or sponsored by the Armed Forces, private and commercial consulting firms, medical and nursing institutions, financial institutions, communication corporations, airlines, governmental agencies, etc.

the visualization used; (b) the method by which the visualized instruction is presented to learners (externally paced vs. self-paced); (c) learner characteristics, i.e., intelligence, prior knowledge in the content area, reading and/or oral comprehension level, etc.; (d) the type or level of educational objective to be achieved by the learners; (e) the technique(s) used to focus student attention on the essential characteristics in the visualized materials, e.g., cues such as questions, arrows, motion, verbal/visual feedback, overt/covert responses, etc.; and (f) the type of test format (evaluation procedure) employed to assess student information acquisition, e.g., for certain types of educational objectives visual tests have been found to provide more valid assessments of the amount of information learners acquire by means of visualized instruction.

The text, Strategies for Improving Visual Learning published in 1978 summarizes and integrates the research findings obtained from the Program to that date. The text emphasized the interrelatedness of variables associated with the effective use of visual materials, and it attempted to draw trends from prior research relative to the effective design and use of visual media. In this respect, it presented the concept of visualized instruction, not as an isolated phenomena, but as an interrelated constituent process operating at varying levels of complexity--the elements of which acquire significance only in the context in which they are used.

In an attempt to provide an integrated and comprehensive treatment of the variables associated with visualized instruction, the text cites more than 650 articles depicting research results, insights, and conclusions of more than 625 researchers representing numerous scienficic disciplines.

Since the inception of the Program, more than 200 lectures describing the findings and implications of this research have been presented by the author and his colleagues at the international, national, regional, and state levels. These lectures stressed the effectiveness and efficiency which can be contributed to the learning environment by properly designed and developed visualized instructional materials. Techniques and procedures for establishing specific guidelines for the development and use of visualized materials have also been described. Additionally, in an attempt to communicate the practical implications of the results of this research program more than 50 articles have been written for the practitioner and published in non-refereed journals.

The conceptual orientation and experimental materials developed in the Program of Systematic Evaluation has provided the basis for three M.S. degrees and twenty-five Ph.D. degrees at The Pennsylvania State University. Similar research, employing the same experimental materials has been conducted at the University of Virginia, Michigan State University, Kent State University, Ohio State University, Texas A&M University, Boston University, University of Pittsburgh, and Newcastle upon Tyne Polytechnic (Great Britain).

At the present time visualization is being used extensively at all levels of education in an attempt to improve the quality of the teaching-learning process. Current projections for the future call for increased use of a variety of new electronic (visual) mediating systems of instruction (interactive) microcomputers, video disc systems, telecommunications, satellite and educational television, etc.) to be infused into both traditional and non-traditional

instructional strategies. This increase in the use of the visual medium will be in addition to conventional multi-media systems (slide-audiotape, film, pictures, videotape, overhead transparencies, visualized texts and workbooks, etc.) already considered to be integral components of effective instructional strategies. Within these varied instructional strategies the use of the visual medium has been optimized to assist learners in acquiring, transmitting and applying information.

In response to this need for guidelines leading to the effective use of visualization in the teaching-learning process the research within the Program continues. Each year a few doctoral students at The Pennsylvania State University select this area for their thesis dissertation work, the experimental instructional materials are being put on video disk at the University of Maryland, the experimental materials have also been put on microfiche so that they would be accessible to the Plato system at the University of Edmonton, a study out of Concordia University (Quebec) will be conducted shortly using the Telidon System--the Canadian proposal for Videotex Systems. In addition, a series of studies utilizing these same instructional materials have been scheduled for the Fall at Ohio State University.

The future of the Program and its potential for resolving specific instructional problems seems bright. We would welcome your active participation in the Program to make its impact "brighter" and more immediate.

References

Dwyer, F. M. (1978) Strategies for Improving Visual Learning. State College, PA: Learning Services, Box 784.